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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/600,644	06/23/2003	Lizamma Mathew	Q76185	6124
23373	7590	05/05/2004	EXAMINER	
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			ASINOVSKY, OLGA	
			ART UNIT	PAPER NUMBER
			1711	

DATE MAILED: 05/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/600,644

Applicant(s)

MATHEW ET AL.

Examiner

Olga Asinovsky

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5, 10-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Fagerburg U.S. Patent 4,180,528.

The present invention is an acrylonitrile block copolymer comprising component (A) represented by the formula in the present claim 1 and a (meth)acrylonitrile (B), wherein a component (A) is a linear saturated polyester having "Y" radical which is remaining after removal of the hydrogen atom of a terminal hydroxy (OH) functional group of a polyester.

Fagerburg discloses a A-B-A type block copolymer having A-block such as polyacrylonitrile and a B-block which is a linear saturated polyester having the structure at column 2, line 15. The B-block polyester having "Y" radical is a copolyester of caprolactone and (di)ethylene glycol, column 3, lines 60-67. The B-block copolyester is readable in applicants' A polyester. The A-B-A type block copolymer has a molecular

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weight of at least 5,000, column 7, line 17. The block copolymer A-B-A in Fagerburg is readable in applicants' claimed acrylonitrile block copolymer.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-5 and 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kudo et al U.S. Patent 3,935,153

5. Kudo discloses a molding composition and a method for producing said molding composition. The composition comprising a straight chain saturated polyester and polymerizable monovinyl monomers including styrene, (meth)acrylonitrile and (meth)acrylic acid esters, column 2, lines 54-68 and column 4, lines 26-33. The straight chain saturated polyester can be a polycaprolactone, column 10, line 28. Kudo discloses a method of producing the straight chain saturated polyester having an average molecular weight of 1,000 to 50,000. The polyester in Kudo is readable in applicants' claimed A- polyester. The polyester is incorporated in the polymerization system prior to the polymerization of monovinyl monomer(s), column 2, lines 58-60. The polymerizable (meth)acrylonitrile is readable in applicants' claimed B-acrylonitrile. The difference between the present claims and Kudo is that Kudo does not disclose a block copolymer. However, it would have been obvious to one of ordinary skill in the art

to consider that a molding composition in Kudo is a block copolymer because the polymerization of monovinyl monomer is made in the presence of a polyester.

Also, the difference between the present claims and Kudo is that the present claims require a B segment of acrylonitrile. Kudo discloses a mixture of styrene and other monovinyl monomer such as acrylonitrile, column 4, lines 26-29. It would have been obvious to one of ordinary skill in the art to consider that acrylonitrile block can be modified in the present claims by incorporating styrene monomer because the claim language comprising is open to any additional monomer makeup, and the other polymerizable monomers can be selected for obtaining the desired impact strength properties of the resulting molding composition.

6. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fagerburg U.S. Patent 4,180,528 as applied to claims 1-5 and 10-11 above, and further in view of Matyjaszewski et al U.S. Patent 5,763,548.

7. Fagerburg has been discussed in the paragraph 2 above. Fagerburg does not disclose a $PDI = M_w/M_n$ of "A" segment=polyester being about 1.05 to 2 in the present claims 6-7.

Matyjaszewski discloses a process for making a block copolymer by atom transfer radical polymerization (ATRP), column 14, lines 19-44. Any radically polymerizable alkene can be used for polymerization, column 6, lines 37-67 and column 18, lines 46-

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48. The polydispersity index is low and is smaller than in a conventional radical polymerization such that a M_w/M_n is <1.5 , column 32m lines 47-49.

It would have been obvious to one of ordinary skill in the art to use the atom transfer radical polymerization (ATRP) method as disclosed by Matyjaszewski and to consider that a block copolymer in Fagerburg can be produced by the ATRP method, and, thereby, obtain the M_w/M_n in the range of 1.05 to 2 because any catalyst system can be used in the invention of Fagerburg.

8. Claims 12-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matyjaszewski et al U.S. Patent 5,763,548.

9. The independent claim 12 discloses a method for producing an acrylonitrile block copolymer including the step of halogenating a terminal group of a polyester to form a macroinitiator and contacting the macroinitiator with acrylonitrile by controlled radical polymerization. Any polyester could be considered in the present claim 12. Any catalyst system can be used for producing a polyester in the present claim 12.

Matyjaszewski discloses a controlled free radical polymerization process by atom or group transfer radical polymerization (ATRP). Any radically polymerizable alkene including (meth)acrylate esters and (meth)acrylonitrile can be used, column 6, lines 27-67 and column 8, lines 23-25. Reference discloses a method of producing the end functionality of the polymer wherein a halogen end group is readable in the present

claim 12, column 18, lines 26-38. A method includes step of the additional polymerization with the same or different monomer(s) for producing multi-block copolymer, column 14, lines 37-44. The polydispersity index is low and is smaller than in a conventional radical polymerization such that a M_w/M_n is <1.5 , column 32m lines 47-49. The atom transfer radical polymerization (ATRP) process in Matyjaszewski invention is readable in applicants' claimed method for producing an acrylonitrile block copolymer. The metal catalyst compound in Matyjaszewski invention is readable in applicants' claims 22-27.

The difference between the present claims and Matyjaszewski is that the present independent claim 12 requires for producing of halogenated polyester =macroinitiator in the first step, than, contacting the obtained macroinitiator with acrylonitrile. However, there is no catalyst system for making a polyester in the present claim 12.

Matyjaszewski discloses that the blocks can be prepared in essentially any order, column 14, line 46. It would have been obvious to one of ordinary skill in the art to consider that a polyester can be produced by atom transfer radical polymerization method as disclosed in Matyjaszewski invention in the first step for making a halogenated functional polymer, than, the additional polymerization of different monomer such as acrylonitrile for producing a block copolymer. The motivation is that it is within the skill of one in the art to use a catalyst system as disclosed by Matyjaszewski for producing an acrylonitrile block copolymer wherein the blocks are prepared in any order.

Claim Rejections - 35 USC § 112

10. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

11. Claims 12 and 14 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a polyester block represented by the formula as disclosed on page 4, does not reasonably provide enablement for any polyester block. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. In particular, in the present specification at pages 4-5, the inventors disclose a linear saturated polyester, which may have an aryl side group, and a cyclic ester such as polycaprolactone, polyvalerolactone, polybutyrolactone, polylactide or their copolymer. In the working examples at pages 9-10 the inventors disclose a polycaprolactone and the method of making a said polycaprolactone (PCL) and a bromination of the polycaprolactone. In light of the relative lack of direction provided by the inventors for using any polyester it is concluded that it would have required undue experimentation for one of ordinary skill in the art to practice the claimed invention. *In re Wand*, 858 F.2d at 737, 8 USPQ 2d 1400, 1404 (Fed Cir. 1988).

12. Claims 1, 2, 8-9, 11, 12 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

13. In claim 1, a component (A) is indefinite because there is no definition for a radical Y that is remaining after removal of the hydrogen atom of a terminal hydroxyl (OH) functional group of a polyester.

The phrase in claim 2, "wherein the polyester radical Y is polycaprolactone, polyvalerolactone, polybutyrolactone, polylactide or their copolymer radical" makes the polyester indefinite. The radical Y by itself is a cyclic ester. Therefore, the chemical structure for polyester having radical Y in claim 2 is indefinite. In the present specification at page 5, line 12, the polyester block Y is polycaprolactone, polyvalerolactone, polybutyrolactone, polylactide or their copolymer.

In claims 8-9 a number average molecular weight of the acrylonitrile block copolymer as being 1.05 to 2.0 is confusing. These numbers are referring to the polydispersity index.

Claim 11 recites the limitation "a cross-linking agent, surfactant, compatibilizer or dispersant" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim 11. Claim 11 is depending on claim 1. The claim construction is improper for claim 11.

In claim 12 a method for producing an acrylonitrile block copolymer is indefinite because there is no step how to make a polyester in the method claim. A "controlled radical polymerization" step is referring to the polymerization of acrylonitrile in the presence of

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the macroinitiator. There is no difference between a terminal group of a polyester and a linking group linking the polyester block and the polyacrylonitrile block.

In claim 13 there is no definition for "X".

There are no applicants' references with form 1449.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Olga Asinovsky whose telephone number is 571-272-1066. The examiner can normally be reached on 9:00 to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on 571-272-1078. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

O.A.
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April 27, 2004

Olga Asinovsky
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